



(12) **EUROPEAN PATENT APPLICATION**  
published in accordance with Art. 153(4) EPC

(43) Date of publication:  
**29.06.2016 Bulletin 2016/26**

(51) Int Cl.:  
**H04W 8/08** <sup>(2009.01)</sup>

(21) Application number: **14844382.3**

(86) International application number:  
**PCT/CN2014/079824**

(22) Date of filing: **13.06.2014**

(87) International publication number:  
**WO 2015/035809 (19.03.2015 Gazette 2015/11)**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**  
Designated Extension States:  
**BA ME**

(72) Inventors:  
• **OUYANG, Xiang**  
**Shenzhen**  
**Guangdong 518057 (CN)**  
• **HE, Junchen**  
**Shenzhen**  
**Guangdong 518057 (CN)**  
• **CHEN, Xiaojian**  
**Shenzhen**  
**Guangdong 518057 (CN)**

(30) Priority: **11.09.2013 CN 201310413187**

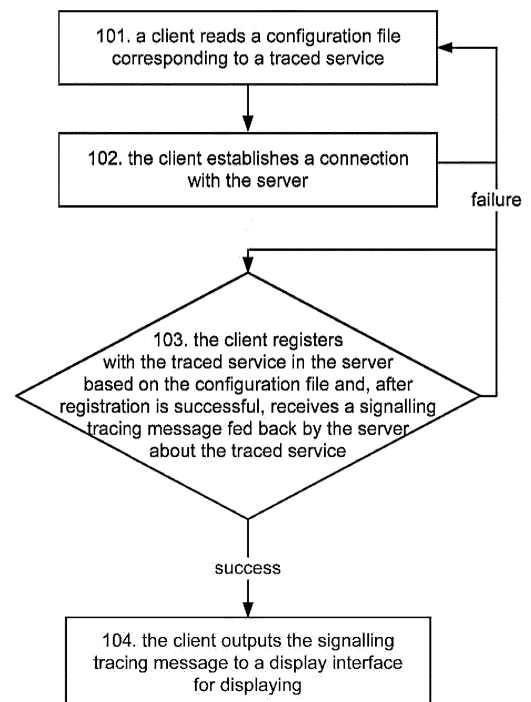
(71) Applicant: **ZTE Corporation**  
**Shenzhen, Guangdong 518057 (CN)**

(74) Representative: **Brevalex**  
**95, rue d'Amsterdam**  
**75378 Paris Cedex 8 (FR)**

(54) **PROCESSING METHOD AND APPARATUS FOR SIGNALING TRACING**

(57) A method and apparatus for processing signalling tracing are provided. The method includes the following steps: a client reads a configuration file corresponding to a traced service (101); the client establishes a connection to a server (102); based on the configuration file, the client registers with the traced service in the server; after registration is successful, the client receives a signalling tracing message fed back by the server about the traced service (103); and the client outputs the signalling tracing message to a display interface(104).

Fig. 1



**Description**

the client outputs the signalling tracing message to a display interface.

**TECHNICAL FIELD**

**[0001]** The present disclosure relates to the intelligent network technology and in particular to a processing method and apparatus for signalling tracing.

**BACKGROUND**

**[0002]** With the rapid development of intelligent network, especially the rise of service systems based on the intelligent network, new requirements for the scale, reliability, universality and expandability of the signalling tracing have been proposed.

**[0003]** In an existing method for signalling tracing, the tracing codes for each traced services are independent. If there are new services needing the signalling tracing, then a tracing code is needed to be rewritten to meet new requirements, and structure presentation information is stored into a database for searching in case that the information needs to be used. All tracing information will be outputted to a display interface for displaying when they are traced.

**[0004]** The existing method for signalling tracing has the following technical problems:

- 1) new tracing codes need to be set for new services, resulting in low scalability and maintainability;
- 2) it takes a long time to search the structure presentation information of a complex structure, which results in a poor user experience;
- 3) when all of the traced information is output to a display interface, it is prone to cause hang of the display interface, and even lead to a system crash since the amount of messages outputted is large.

**SUMMARY**

**[0005]** Embodiments of the present disclosure mainly provide a processing method and apparatus for signalling tracing so as to solve the problems in the related technique.

**[0006]** The technical solutions of the embodiments of the present disclosure are implemented as follows.

**[0007]** According to one aspect of embodiments of the present disclosure, a method for processing signalling tracing is provided, which includes:

a client reads a configuration file corresponding to a traced service; the client establishes a connection between the client and a server; the client registers with the traced service in the server based on the configuration file; and, after registration is successful, the client receives a signalling tracing message fed back by the server about the traced service and

**[0008]** According to another aspect of embodiments of the present disclosure, a processing apparatus for signalling tracing is provided, which includes a reading module, a connection module, a registration module and a receiving and displaying module, in which:

the reading module is configured to read a configuration file corresponding to a traced service;

the connection module is configured to establish a connection between the client and a server;

the registration module is configured to register with the traced service in the server based on the configuration file; and

the receiving and displaying module is configured to receive a signalling tracing message fed back by the server about the traced service and output the signalling tracing message to a display interface.

**[0009]** According to the embodiments of the present disclosure provide a processing method and apparatus for signalling tracing, a client reads a configuration file corresponding to a traced service, establishes a connection with a server, the client registers with the traced service in the server based on the configuration file, receives a signalling tracing message fed back by the server about the traced service after registration is successful, and outputs the signalling tracing message to a display interface. Accordingly, scalability and reliability of a system can be improved. The signalling tracing for a traced service and the analysis and expansion of a signalling message can be completed by reading a configuration file corresponding to the traced service through the client.

**BRIEF DESCRIPTION OF THE DRAWINGS**

**[0010]**

Fig. 1 is a flowchart of a method for processing signalling tracing according to an embodiment of the present disclosure;

Fig. 2 is a flowchart of a process that a client searches a specified directory where configuration files are stored for a configuration file corresponding to a traced service from according to an embodiment of the present disclosure; and

Fig. 3 is a schematic structural diagram of a processing apparatus for signalling tracing according to an embodiment of the present disclosure.

## DETAILED DESCRIPTION

**[0011]** In an embodiment of the present disclosure, a client reads a configuration file corresponding to a traced service, establishes a connection with a server, registers with the traced service in the server based on the configuration file, receives a signalling tracing message fed back by the server about the traced service after registration is successful, and outputs the signalling tracing message to a display interface.

**[0012]** The present disclosure is further explained below in detail with reference to drawings and specific embodiments.

**[0013]** An embodiment of the present disclosure implements a method for processing signalling tracing, as shown in Fig. 1, the method includes the following steps.

**[0014]** Step 101: a client reads a configuration file corresponding to a traced service.

**[0015]** In this step, when signalling tracing for the traced service is initiated by the client, the client searches whether a configuration file corresponding to the traced service exists in a specified directory where configuration files are stored. If the configuration file corresponding to the traced service exists in the specified directory, the configuration file is read by the client, and data in the configuration file is saved in memory. If the configuration file corresponding to the traced service does not exist in the specified directory, a configuration file corresponding to the traced service is created by the client. The specified directory may be any folder in the storage of the client, for example, the specified directory is a scheme folder.

**[0016]** The data in the configuration file includes information used to perform signalling tracing for the traced service, such as a service name, a service identifier, an event number, encoded and decoded information, and presentation information and so on.

**[0017]** The created configuration file is in an extensible markup language (XML) format, including information used to perform signalling tracing for the traced service, such as a service name, a service identifier, an event number, encoded and decoded information, and presentation information and so on.

**[0018]** The service name is a name of the traced service. The service identifier is a number of the traced service. The event number is an event number needed to be traced in the traced service. The encoded and decoded information is the encoded and decoded information corresponding to the traced service. The presentation information is setup information about output of information to a display interface.

**[0019]** As shown in Fig. 2, the client searches whether a configuration file corresponding to a traced service exists in a specified directory where configuration files are stored. Specifically, the searching method includes:

Step 201: the client searches for an XML format file in the specified directory where configuration files are stored.

**[0020]** In this step, based on an exclusion list, the client searches the specified directory for an XML format file which is not included in the exclusion list. The exclusion list is a file list which will be first excluded when the client searches for an XML format file, the files included in the exclusion list may be files set in advance by a user, or files excluded by the client during the searching.

**[0021]** The client determines whether to refer to the exclusion list according to exclusion flag of the exclusion list. The client does not refer to the exclusion list when the exclusion flag indicates that the exclusion list is empty while the client refers to the exclusion list when the exclusion flag indicates that the exclusion list is not empty. The serial number of the exclusion flag is increased sequentially with the increase of excluded files, and the serial number of the exclusion flag is decreased sequentially with the reduction of excluded files.

**[0022]** For example, when the exclusion list is created and there are no files needed to be excluded, the exclusion flag of the exclusion list is 0. Each time a file needed to be excluded is added into the exclusion list, the serial number of the exclusion flag is increased by one. In this way, the exclusion flag of the exclusion list is updated dynamically by the client. When the exclusion list is created, the initial exclusion flag is 0 if the list is empty. In this case, the client reads the exclusion flag of the exclusion list and determines not to refer to the exclusion list when the exclusion flag is 0. When a file needed to be excluded is added into the exclusion list, the exclusion flag is updated to 1, and then the exclusion flag is updated to 2 when another file needed to be excluded is added into the exclusion list. In this case, the client reads the exclusion flag of the exclusion list and determines to refer to the exclusion list when the exclusion flag is 2.

**[0023]** The client determines whether the exclusion list is an empty list, and if it is empty, then the client searched for all of the files in the specified directory. If the exclusion list is not an empty list, then the client reads files in the exclusion list and marks the files in the specified directory which are the same as those in the exclusion list as non-searched files. Then format checking is performed on a file that is not marked as a non-searched file.

**[0024]** In this step, the client checks whether the suffix of the file that is not marked as a non-found file is .XML; if it is, the file is determined to be in an XML format. Then the file is opened and step 202 is executed. If the file is not in an XML format, the file is added into the exclusion list and the remaining files not marked as non-searched files are checked sequentially.

**[0025]** Step 202: the client determines whether the file found out is a configuration file corresponding to a traced service.

**[0026]** In this step, the client views whether there is data about the service name or service identifier in the found file. If there is, it can be determined that the found file is the configuration file. Then the client determines whether the service name or service identifier in the found file is consistent with information of the traced service; if

consistent, then it can be determined that the found file is the configuration file corresponding to the traced service and the configuration file is read by the client; and if not consistent, then the search fails and the process returns to step 201. The upper limit of the number of times that the search fails is set. When the upper limit is reached, the configuration file corresponding to the traced service is created by the client.

**[0027]** Each time the search failure occurs, the serial number of the failure flag is increased by 1 by the client. The serial number of the failure flag is compared with the upper limit of the number of times that the search fails, and execution returns to step 201 if the failure flag is smaller than the upper limit of the number of times that the search fails, otherwise, the configuration file corresponding to the traced service is created by the client if the failure flag is greater than or equal to the upper limit of the number of times that the search fails.

**[0028]** When the client reads the configuration file, the data in the configuration file is read, and the data read from the configuration file is stored in the memory.

**[0029]** Before the client searches for the configuration file corresponding to a traced service, the client may determine whether signalling tracing for the traced service was initiated by searching a tracing history. The tracing history includes the service name of the traced service. After signalling tracing for the traced service is initiated by the client, and a signalling tracing message is received from the server, the service name of the traced service is saved in the tracing history. When signalling tracing for the traced service is initiated by the client next time, whether signalling tracing for the traced service has been initiated is determined by searching if the service name of the traced service exists in the tracing history. If signalling tracing for the traced service has been initiated, the configuration file corresponding to the traced service should be stored in the memory. The step 201 is performed to search for the configuration file. If signalling tracing for the traced service has not yet been initiated, the configuration file corresponding to the traced service needs to be created by the client and stored in the memory. Then the created configuration file is read by the client.

**[0030]** The client may be a computer in several service control points in an intelligent network.

**[0031]** The server may be a mobile terminal, a server, etc. in the intelligent network.

**[0032]** Step 102: the client establishes a connection with the server.

**[0033]** In this step, an interface configuration file is set in advance by the client and stored in the memory. The interface configuration file is in an XML format, including information for being displayed on a display interface, such as display frame information for entering connection information, display frame information for entering registration information and so on. The client reads the interface configuration file and outputs an interactive interface generated dynamically by the interface configuration file

to the display interface. Equipment information and network information of the server is set by a user on the display interface. The client establishes a connection with the server based on the equipment information and network information.

**[0034]** The equipment information includes a physical MAC address, an equipment name, etc. The network information includes an IP address of the equipment, a connection mode, proxy connection information, etc. The connection mode may be a SOCKET connection mode, an HTTP protocol connection mode or an SSH connection mode. The proxy connection information includes a proxy type, a proxy server address, a port number, a username and a password.

**[0035]** When the client initiates a connection with the server, the server is determined according to the equipment information and network information set by the user, and a connection message is sent to the server according to the IP address, connection mode and proxy connection information set by the user. The connection message includes an IP address of the client. The connection message is received and read by the server, and then a feedback message is sent from the server to the IP address of the client. After the client receives the feedback message, it prompts the user through the display interface that a connection has been established between the client and the server. If no feedback message is received by the client, then it indicates that the client and the server fail to establish a connection successfully, the client prompts the user through the display interface to re-enter the equipment information and network information of the server and the connection message is re-sent to the server.

**[0036]** When the connection message is sent from the client to the server, a timer is activated by the client for time keeping. If the feedback message is received by the client before the timer reaches the pre-defined time, then the timer is reset and the client prompts the user through the display interface that a connection has been established between the client and the server. Otherwise, if no feedback message is received by the client when the timer reaches the pre-defined time, then the timer is reset and the client prompts the user through the display interface to re-enter the equipment information and network information of the server according to a failure instruction received and re-initiates a connection to the server.

**[0037]** Step 103: the client registers with the traced service in the server based on the configuration file and, after registration is successful, receives a signalling tracing message fed back by the server about the traced service.

**[0038]** In this step, the client packages registration information entered in the display interface by the user and the event number of the configuration file saved in the memory to generate a registration message based on the encoded and decoded information of the configuration file saved in the memory, and then sends the registration message to the server. The received registration

message is decoded by the traced service in the server based on the encoded and decoded information set by the traced service itself. If the registration message can be decoded, then it indicates that the registration message is sent to the traced service, the registration message is read by the traced service and registration of the client is completed. The traced service sends a message that the registration is successful to the client through the server. After the message that the registration is successful is received by the client, the client waits to receive a signalling tracing message fed back by the server about the traced service. If the registration message cannot be decoded, then it indicates that the registration message is not sent to the traced service, and the registration of the client is cancelled by the traced service. When the message that the registration is successful is not received by the client in the predetermined waiting time, the step 101 is performed. The registration information includes information for the server to determine the identity of the client, such as user account and so on.

**[0039]** The timer is activated by the client for time keeping when the client sends the registration message to the equipment. If the message that the registration is successful is received by the client within the predetermined waiting time, then the timer is reset. If the message that the registration is successful is not received when the timer reaches the predetermined waiting time, then the timer is reset and the step 101 is performed.

**[0040]** When the event corresponding to the event number in the configuration file occur in the traced service, a signalling tracing message corresponding to the event is fed back by the server to the client. The client receives the signalling tracing message fed back by the server about the traced service, where the signalling tracing message is generated by encrypting and encapsulating the tracing information of the event happening in the traced service through the server.

**[0041]** Step 104: the client outputs the signalling tracing message to a display interface for displaying.

**[0042]** In this step, the received signalling tracing message is read and decoded by the client according to the structure presentation information stored in the memory. Formats of the tracing information decoded by the client are converted into an XML format based on struct header files of the C programming language. The converted messages are saved in the memory, and then outputted to the display interface.

**[0043]** The messages can be outputted to the display interface for paging display in order to prevent the amount of messages outputted from being too large, resulting in hang of the display interface or causing a system crash. As such, the presentation information in the created configuration file also needs to include the upper limit of the number of messages displayed in each page of the display interface. The tracing information obtained from decoding is divided into several pages according to the upper limit of the messages displayed in each page, and outputted to the display interface for paging display. For

example, if there are 1000 tracing messages obtained from decoding while the upper limit of the number of messages displayed in each page set by the user is 100, then the tracing information obtained from decoding are divided into 10 pages by the client according to the upper limit of the number of messages displayed in each page set by the user, and the information is outputted to the display interface for displaying in 10 pages.

**[0044]** In order to implement the method mentioned above, an embodiment of the present disclosure also provides a processing apparatus for signalling tracing. The apparatus is provided in the client, as shown in Fig. 3, the apparatus includes a reading module 31, a connection module 32, a registration module 33 and a receiving and displaying module 34.

**[0045]** The reading module 31 is configured to read a configuration file corresponding to a traced service, and may be implemented as a host processor of the client.

**[0046]** The connection module 32 is configured to establish a connection between the client and the server, and may be implemented as a network adapter of the client.

**[0047]** The registration module 33 is configured to register with the traced service in the server based on the configuration file, and may be implemented as a host processor of the client.

**[0048]** The receiving and displaying module 34 is configured to receive a signalling tracing message fed back by the server about the traced service and output the signalling tracing message to a display interface, and may be implemented as a display adapter of the client.

**[0049]** The apparatus further includes a creating module 35, configured to create the configuration file corresponding to the traced service and save the configuration file in a specified directory. The host processor of the client may be adopted for implementing the creating module.

**[0050]** The apparatus further includes a searching module 36, configured to search for the configuration file corresponding to the traced service in the specified directory where the configuration files are stored. The searching module 36 is further configured to determine that a format of the configuration file is an XML format and determine that the configuration file is the configuration file corresponding to the traced service. The host processor of the client may be adopted for implementing the search module.

**[0051]** Specifically, when signalling tracing for the traced service is initiated by the client, the searching module 36 searches if a configuration file corresponding to the traced service exists in the specified directory. If the configuration file corresponding to the traced service exists in the specified directory, the configuration file is read, and data in the configuration file is saved in memory. If the configuration file corresponding to the traced service does not exist in the specified directory, a creating message is sent to the creating module 35. A configuration file corresponding to the traced service is created by cre-

ating module 35 based on the creating message. The specified directory may be any folder in the storage of the client, for example, the specified directory is a scheme folder.

**[0052]** The data in the configuration file includes information used to perform signalling tracing for the traced service, such as a service name, a service identifier, an event number, encoded and decoded information, and presentation information and so on.

**[0053]** The created configuration file is in an XML format, including information used to perform signalling tracing for the traced service, such as a service name, a service identifier, event number, encoded and decoded information, and presentation information and so on.

**[0054]** The service name is a name of the traced service. The service identifier is a number of the traced service. The event number is the event number needed to be traced in the traced service. The encoded and decoded information is the encoded and decoded information corresponding to the traced service. The presentation information is setup information about output of information to a display interface.

**[0055]** The reading module 31 is further configured to read the interface configuration file set in advance and output an interactive interface generated dynamically by the interface configuration file to the display interface.

**[0056]** The searching module 36 is configured to search for a XML format file in the specified directory where the configuration files are stored. Based on an exclusion list, the searching module 36 searches the specified directory for the XML format file which is not included in the exclusion list. The exclusion list is a file list which is first excluded when searching for the XML format file, the files included in the exclusion list may be files set in advance by a user, or files excluded during the searching. The searching module 36 is further configured to determine whether to refer to the exclusion list according to an exclusion flag of the exclusion list. It is determined to not refer to the exclusion list when the exclusion flag indicates that the exclusion list is empty. It is determined to refer to the exclusion list when the exclusion flag indicates that the exclusion list is not empty. The exclusion flag is increased in serial number sequentially with the increase of excluded files, and the exclusion flag is decreased in serial number sequentially with the reduction of excluded files.

**[0057]** For example, when the exclusion list is created and there is no file needed to be excluded, the exclusion flag of the exclusion list is 0. Each time a file needed to be excluded is added into the exclusion list, the exclusion flag is increased by one in serial number. In this way, the exclusion flag of the exclusion list is updated dynamically by the searching module 36. When the exclusion list is created, the initial exclusion flag is 0 if the list is empty. In this case, the exclusion flag of the exclusion list is read, and it is determined not to refer to the exclusion list when the exclusion flag is 0. When a file needed to be excluded is added into the exclusion list, the exclusion flag is up-

dated to 1, and the exclusion flag is then updated to 2 when another file needed to be excluded is added into the exclusion list. In this case, after the exclusion flag of the exclusion list is read, it is determined to refer to the exclusion list when the exclusion flag is 2.

**[0058]** The searching module 36 is configured to determine whether the exclusion list is an empty list, and if it is empty, then the specified directory is searched for all of the files therein. If the exclusion list is not an empty list, then files in the exclusion list are read and files in the specified directory which are the same as those in the exclusion list are marked as non-searched files. Then format checking is performed on a file that is not marked as a non-searched file.

**[0059]** The searching module 36 is further configured to check if the file that is not marked as a non-searched file is in an XML format, and check whether the suffix of the found file is .XML or not, and if it is, determine the file is in an XML format. Then the file is opened and whether the found file is the configuration file corresponding to the traced service is determined; if it is not the configuration file, then add the file into the exclusion list and check the remaining files not marked as non-searched files sequentially.

**[0060]** Determining whether the found file is the configuration file corresponding to the traced service specifically includes: viewing whether there is data about the service name or service identifier in the found file. If there is, it can be determined that the found file is the configuration file. Then whether the service name or service identifier in the found file is consistent with information of the traced service is determined; if consistent, it can be determined that the found file is the configuration file corresponding to the traced service and the configuration file is sent to the reading module 31 for reading; if not consistent, then the search fails and the specified directory is searched again for files. The upper limit of the number of times that the search fails is set. When the upper limit is reached, a creating message is sent to the creating module 35. The creating module 35 creates the configuration file corresponding to the traced service according to the creating message.

**[0061]** Each time the search failure occurs, failure flag is increased by 1 in serial number. The failure flag is compared with the upper limit of the number of times that the search fails, re-searching the files in the specified directory if the failure flag is smaller than the upper limit of the number of times that the search fails, otherwise the creating message is sent to the creating module 35 if the failure flag is greater than or equal to the upper limit of the number of times that the search fails. The creating module 35 creates the configuration file corresponding to the traced service according to the creating message.

**[0062]** The searching module 36 is further configured to determine whether signalling tracing for the traced service was initiated by searching a tracing history. The tracing history includes the service name of the traced service. When signalling tracing for the traced service is

initiated, whether signalling tracing for the traced service was initiated is determined by searching if the service name of the traced service exists in the tracing history. If the signalling tracing for the traced service was initiated, the configuration file corresponding to the traced service was saved in the memory. The specified directory is searched for files. If the signalling tracing for the traced service has not yet been initiated, a creating message needs to be sent to the creating module 35. The configuration file corresponding to the traced service is created by the creating module 35 according to the creating message and stored in the memory. Then the created configuration file is read by the reading module 31.

**[0063]** The receiving and displaying module 34 is configured to save the service name of the traced service in the tracing history after receiving the signalling tracing message fed back by the server.

**[0064]** The apparatus further includes an interface configuration module 37, configured to set an interface configuration file in advance and store the interface configuration file in the memory. A display adapter of the client may be adopted for implementing the interface configuration module. The interface configuration file is in an XML format, including information for being displayed in the display interface, such as display frame information for entering connection information, display frame information for entering registration information and so on. An interactive interface generated dynamically by the interface configuration file is outputted to the display interface. Equipment information and network information of the server is set by a user in the display interface. The client establishes a connection with the server based on the equipment information and network information.

**[0065]** The equipment information includes information for determining equipment, such as a physical MAC address, an equipment name, etc. The network information includes information for connecting with the equipment, such as an IP address of the equipment, a connection mode, proxy connection information, etc. The connection mode may be a SOCKET connection mode, an HTTP protocol connection mode or an SSH connection mode. The proxy connection information includes a proxy type, a proxy server address, a port number, a username and a password.

**[0066]** The connection module 32 is configured to determine the server according to the equipment information and network information set by the user when a connection to the server is established. A connection message is sent to the server according to the IP address, connection mode and proxy connection information set by the user. The connection message includes an IP address of the client. The connection message is received and read by the server, and then a feedback message is sent from the server to the IP address of the client. After the connection module 32 receives the feedback message, it prompts the user that a connection has been established with the server through the interface configuration module 37. If no feedback message is received

by the connection module 32, then it indicates that the client and the server fail to establish a connection successfully, the user is prompted to re-enter the equipment information and network information of the server through the interface configuration module 37 and the connection to the server is initiated again.

**[0067]** The connection module 32 is further configured to activate a timer for time keeping when the connection message is sent to the server. If the feedback message is received before the timer reaches the pre-defined time, then the timer is reset and the user is prompted through the interface configuration module 37 that a connection has been established with the server. Otherwise, if no feedback message is received when the timer reaches the pre-defined time, the timer is reset and the user is prompted through the interface configuration module 37 to re-enter the equipment information and network information of the server according to failure instruction received and a connection to the server is initiated again.

**[0068]** The registration module 33 is configured to package the registration information entered in the display interface by the user and the event number of the configuration file saved in the memory to generate a registration message based on the encoded and decoded information of the configuration file saved in the memory. Then the registration message is sent to the server. The received registration message is decoded by the traced service in the server based on the encoded and decoded information set by the traced service itself. If the registration message can be decoded, then it indicates that the registration message is sent to the traced service, the registration message is read by the traced service and registration of the client is completed. The traced service sends a message that the registration is successful to the client through the server. After the message that the registration is successful is received by the client, the client waits to receive a signalling tracing message fed back by the traced service in the server. If the registration message cannot be decoded, then it indicates that the registration message is not sent to the traced service, and the registration of the client is cancelled by the traced service. When the message that the registration is successful is not received by the client in the predetermined waiting time, a message is sent to the reading module 31. The registration information includes information for the server to determine the identity of the client, such as user account and so on.

**[0069]** The registration module 33 is further configured to activate the timer for time keeping when sending the registration message to the equipment. If the message that the registration is successful is received within the predetermined waiting time, then the timer is reset. If the message that the registration is successful is not received when the timer reaches the predetermined waiting time, then the timer is reset and a message is sent to the reading module 31.

**[0070]** The apparatus further includes a conversion module 38, configured to convert the format of the sig-

nalling tracing message received by the receiving and displaying module 34 into an XML format based on struct header files of the C programming language and send the message to the receiving and displaying module 34. The host processor of the client may be adopted for implementing the conversion module.

**[0071]** The receiving and displaying module 34 is configured to receive the signalling tracing message fed back by the server about the traced service. The signalling tracing message is decoded according to the structure presentation information of the configuration file stored in the memory. Formats of the tracing information obtained after decoding are converted into an XML format by the conversion module 38. The messages are saved in the memory, and then the messages are outputted to the display interface. The signalling tracing message is generated by encrypting and encapsulating the tracing information of the event triggered in the traced service through the server when the event corresponding to the event number in the configuration file is triggered in the traced service.

**[0072]** The messages can be outputted to the display interface for paging display in order to prevent the amount of messages outputted from being too large, resulting in hang of the display interface or causing a system crash. As such, the presentation information in the configuration file created by the creating module 35 also needs to include the upper limit of the number of messages displayed in each page of the display interface. The tracing information obtained from decoding are divided into several pages according to the upper limit of the number of messages displayed in each page, and outputted to the display interface for paging display. For example, if the number of tracing messages obtained from decoding is 1000 and the upper limit of the number of messages displayed in each page set by the user is 100, then the tracing information obtained from decoding are divided into 10 pages by the client according to the upper limit of the number of messages displayed in each page set by the user, and the information is outputted to the display interface for displaying in 10 pages.

**[0073]** What described are merely preferable embodiments of the present disclosure and are not intended to limit the scope of protection of the present disclosure.

## Claims

1. A method for processing signalling tracing, comprising:

reading, by a client, a configuration file corresponding to a traced service;  
 establishing, by the client, a connection between the client and a server;  
 registering with, by the client, the traced service in the server based on the configuration file; and  
 receiving, by the client, a signalling tracing mes-

sage of the traced service fed back by the server after the registration is successful, and outputting, by the client, the signalling tracing message to a display interface.

2. The method according to claim 1, further comprising: before reading, by the client, the configuration file corresponding to the traced service, creating, by the client, the configuration file corresponding to the traced service and saving, by the client, the created configuration file in a specified directory.
3. The method according to claim 1, further comprising: before reading, by the client, the configuration file corresponding to the traced service, searching for, by the client, the configuration file corresponding to the traced service in a specified directory where configuration files are saved.
4. The method according to claim 1, further comprising: before establishing, by the client, the connection between the client and the server, reading, by the client, an interface configuration file set in advance and outputting an interactive interface generated dynamically by the interface configuration file to the display interface.
5. The method according to claim 1, further comprising: after receiving, by the client, the signalling tracing message fed back by the server about the traced service, converting, by the client, a format of the received signalling tracing message into an extensible markup language (XML) format.
6. An apparatus for processing signalling tracing, comprising a reading module, a connection module, a registration module and a receiving and displaying module, wherein the reading module is configured to read a configuration file corresponding to a traced service; the connection module is configured to establish a connection between the client and a server; the registration module is configured to register with the traced service in the server based on the configuration file; and the receiving and displaying module is configured to receive a signalling tracing message fed back by the server about the traced service and output the signalling tracing message to a display interface.
7. The apparatus according to claim 6, further comprising a creating module configured to create the configuration file corresponding to the traced service and save the created configuration file in a specified directory.



8. The apparatus according to claim 6, further comprising a searching module configured to search for the configuration file corresponding to the traced service in a specified directory where configuration files are saved. 5
9. The apparatus according to claim 6, wherein the reading module is further configured to read an interface configuration file set in advance and output an interactive interface generated dynamically by the interface configuration file to the display interface. 10
10. The apparatus according to claim 6, further comprising a conversion module configured to convert a format of the signalling tracing message received by the receiving and displaying module into an extensible markup language (XML) format and send the converted signalling tracing message to the receiving and displaying module. 15
- 20
- 25
- 30
- 35
- 40
- 45
- 50
- 55

Fig. 1

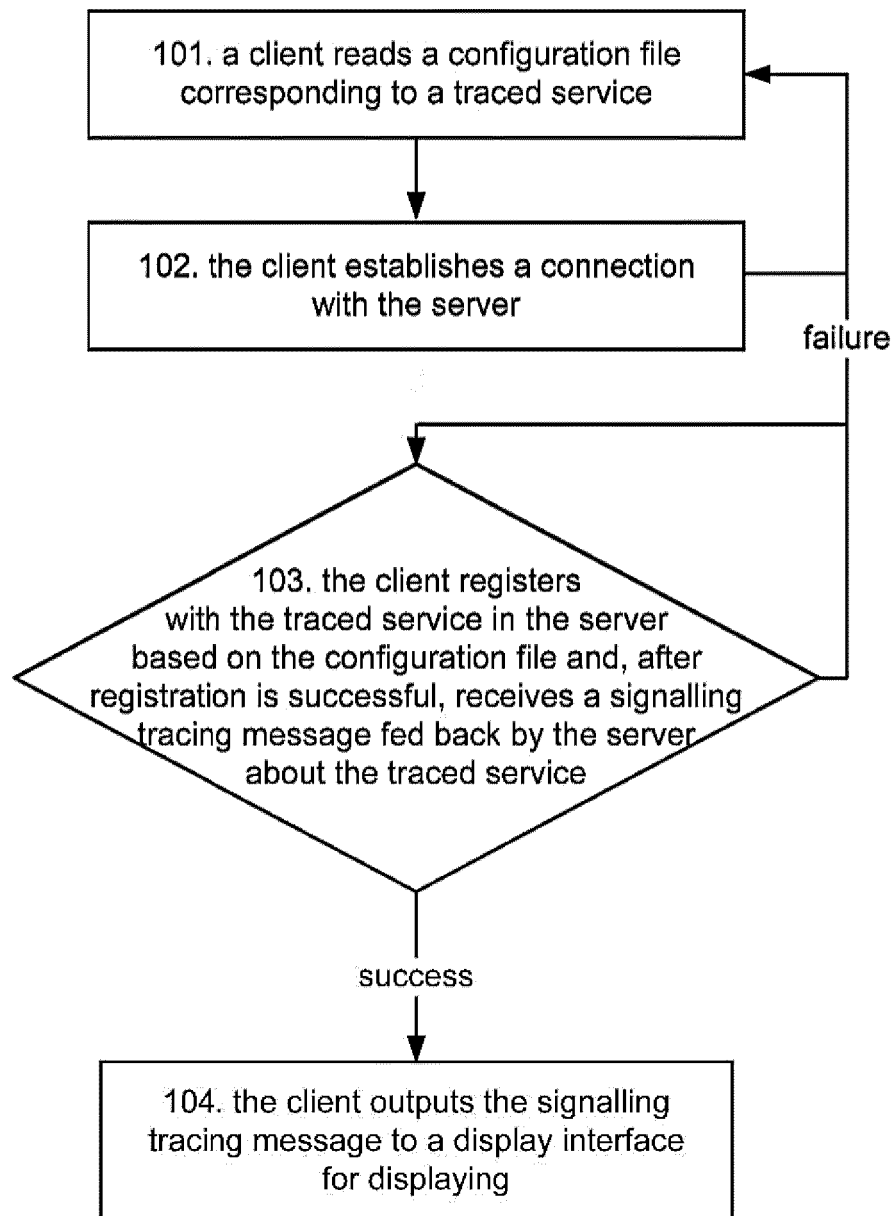


Fig. 2

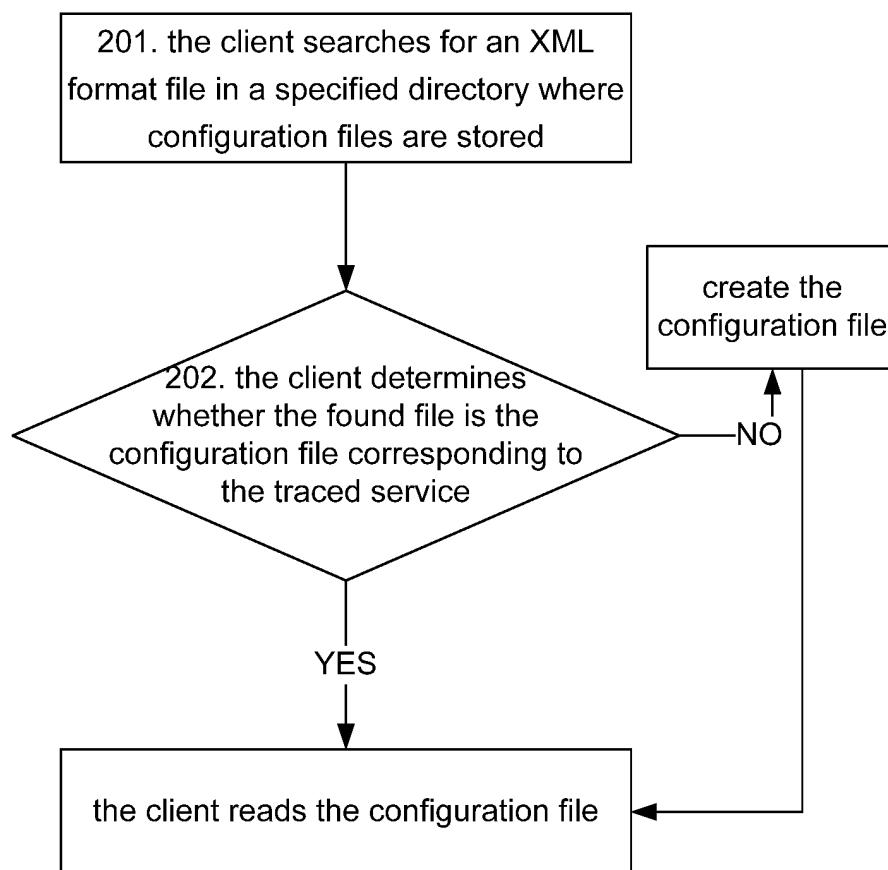
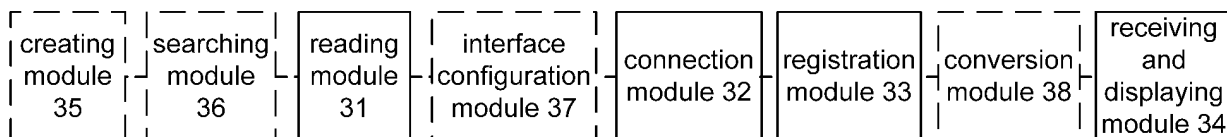


Fig. 3



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2014/079824

## A. CLASSIFICATION OF SUBJECT MATTER

H04W 8/08 (2009.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: H04W; H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNTXT, VEN, CNKI, 3GPP, BAIDU: signaling w trac+, configure+ w file?, service w (ID or identifier?) (in Chinese), signaling, trac+, trace, configur+, file?, configuration, service, ID

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                     | Relevant to claim No. |
|-----------|------------------------------------------------------------------------------------------------------------------------|-----------------------|
| A         | CN 101667928 A (ZTE CORPORATION) 10 March 2010 (10.03.2010) the abstract, claims 1-13                                  | 1-10                  |
| A         | CN 102739422 A (ZTE CORPORATION) 17 October 2012 (17.10.2012) the abstract, claims 1-20                                | 1-10                  |
| A         | CN 101163312 A (ZTE CORPORATION) 16 April 2008 (16.04.2008) the whole document                                         | 1-10                  |
| A         | CN 102196394 A (ZTE CORPORATION) 21 September 2011 (21.09.2011) the whole document                                     | 1-10                  |
| A         | WO 2012024916 A1 (ZTE CORPORATION) 01 March 2012 (01.03.2012) the whole document                                       | 1-10                  |
| A         | CN 102196392 A (DATANG MOBILE COMMUNICATIONS EQUIPMENT CO., LTD.)<br>21 September 2011 (21.09.2011) the whole document | 1-10                  |

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

|                                                                                                                                                                         |                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| * Special categories of cited documents:                                                                                                                                | "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention                                              |
| "A" document defining the general state of the art which is not considered to be of particular relevance                                                                | "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone                                                                     |
| "E" earlier application or patent but published on or after the international filing date                                                                               | "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |
| "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "&" document member of the same patent family                                                                                                                                                                                                    |
| "O" document referring to an oral disclosure, use, exhibition or other means                                                                                            |                                                                                                                                                                                                                                                  |
| "P" document published prior to the international filing date but later than the priority date claimed                                                                  |                                                                                                                                                                                                                                                  |

Date of the actual completion of the international search

12 September 2014 (12.09.2014)

Date of mailing of the international search report

22 September 2014 (22.09.2014)

Name and mailing address of the ISA  
State Intellectual Property Office of the P. R. China  
No. 6, Xitucheng Road, Jimenqiao  
Haidian District, Beijing 100088, China  
Facsimile No. (86-10) 62019451

Authorized officer

WU, Xinghua

Telephone No. (86-10) 62089556

**INTERNATIONAL SEARCH REPORT**  
 Information on patent family members

 International application No.  
 PCT/CN2014/079824

| Patent Documents referred<br>in the Report | Publication Date | Patent Family    | Publication Date |
|--------------------------------------------|------------------|------------------|------------------|
| CN 101667928 A                             | 10.03.2010       | CN 101667928 B   | 23.05.2012       |
| CN 102739422 A                             | 17.10.2012       | WO 2012136050 A1 | 11.10.2012       |
| CN 101163312 A                             | 16.04.2008       | CN 101163312 B   | 05.09.2012       |
| CN 102196394 A                             | 21.09.2011       | AU 2010348839 A1 | 01.11.2012       |
|                                            |                  | WO 2011113252 A1 | 22.09.2011       |
|                                            |                  | US 2012329450 A1 | 27.12.2012       |
|                                            |                  | EP 2525590 A1    | 21.11.2012       |
|                                            |                  | JP 2013522979 A  | 13.06.2013       |
| WO 2012024916 A1                           | 01.03.2012       | US 2013150008 A1 | 13.06.2013       |
|                                            |                  | CN 102387491 A1  | 21.03.2012       |
|                                            |                  | EP 2611231 A1    | 03.07.2013       |
|                                            |                  | JP 2013539632 A  | 24.10.2013       |
|                                            |                  | HK 1181953 A0    | 15.11.2013       |
| CN 102196392 A                             | 21.09.2011       | CN 102196392 B   | 27.11.2013       |